REMARKS

Claims 1, 2, 4, 5, and 14-51 are all of the claims pending in the present Application. New claims 38-51 are added. An excess claims fee letter and fee are attached hereto.

The Examiner has imposed an Election/Restrictions Requirement in the Office Action dated September 21, 2004. Applicant responds to this requirement in the next section below.

Claim 14 is understood as being allowed over the prior art of record. Applicant also understands that, based on the prior art of record, claim 27 would be allowable if rewritten in independent format but declines at this time to rewrite this claim in view of the disqualification of Aoki, as explained in the previous Amendment and repeated below. Claims 1, 2, 4, 5 and 15-26 stand rejected under 35 USC §103(a) as unpatentable over US Patent 6,096,648 to Lopatin et al., taken in combination with US Patent 6,037,664 to Zhao et al., and US Patent 6,624,061 to Aoki.

However, has previously described in the last Amendment, Aoki is disqualified under 35 USC §103(c) as being prior art against the present Application, since it is commonly assigned to NEC Electronics Corporation, and, at the time of the invention, the invention of Aoki and the present invention were commonly owned. Thus, Aoki would qualify only as prior art under §102(e) by reason of the US filing date of May 14, 1999, for Aoki and the Japanese priority date of July 30, 1999, for the present Application. Therefore, Aoki is removed as a prior art reference based on the 35 USC §103(c) "safe harbor".

It is also noted that, notwithstanding any claim amendments made herein, Applicant's intent is to encompass equivalents of all claim elements, even if amended herein or later during prosecution.

I. THE ELECTION/RESTRICTIONS REQUIREMENT

In response to the Election/Restrictions requirement in the Office Action dated September 21, 2004, Applicant hereby elects Species IV (claims 28-37) with traverse, since it is not at all clear upon what basis in the MPEP the Examiner is relying upon for this requirement. That is, although Applicant agrees with the Examiner's characterization that the grouping of claims in the Office Action is patentably distinct, Applicant also respectfully

submits that the requirement fails to comply with the procedure defined in MPEP §806.04(e):

"*Claims are definitions of inventions. Claims are never species.... Claims are always the specifically different embodiments.*" (Emphasis in MPEP itself)

Applicant declines to cancel any non-elected claims at this time.

II. THE CLAIMED INVENTION

As described and claimed, for example by elected claim 32, the present invention is directed to a semiconductor device including a plurality of copper (Cu) wiring lines and an insulating layer which insulates between the plurality of Cu wiring lines. The insulating layer has a surface region whose Cu concentration is equal to or higher than 10^{19} atoms/cm^3.

As mentioned in the previous Amendment, it is disclosed on page 11 at lines 11 to 20 and in Figure 4 that the Cu concentration of the surface region of the insulating layer is equal to 10^{19} atoms/cm^3.

By examining the relationship between the leakage current and the Cu concentration of the insulating layer, the inventor discovered that when the Cu concentration of the insulating layer reaches the order of 10^{19} atoms/cm^3, there is an influence of the leakage current.

In the experiment that the inventor carried out, the Cu concentration in HSQ is in the order of 10^{19} atoms/cm^3 at a position which is 50 nm or less from the contact surface of the HSQ and the Cu wiring lines and is less than 10^{19} atoms/cm^3 at a position which is equal to or more than 50 nm (e.g., see Figure 4).

Therefore, the inventor found that if the thickness of HSQ is equal to or thicker than 50 nm, a device that is not influenced by the leakage current can be obtained. This result was found by the inventor carrying out an experiment, focusing on the relationship between the leakage current and the Cu concentration of the insulating layer. This result is not described or taught in the cited references.

The distribution of Cu concentration of the insulating layer differs by the conditions for forming the insulating layer and the conditions for manufacturing the device. Namely, the distribution of Cu concentration of the insulating layer is not unique to the insulating layer. Therefore, claims 28 to 37 are not apparent from the cited references.

That is, turning to the clear language of the claims, in the cited references, there is no teaching or suggestion of: "... an insulating layer which insulates between said plurality of Cu wiring lines, wherein said insulating layer has a surface region whose Cu concentration is equal to or higher than 10^{19} atoms/cm^3."

III. FORMAL MATTERS AND CONCLUSION

In view of the foregoing, Applicant submits that claims 1, 2, 4, 5, and 14-51, all the claims presently pending in the application, are patentably distinct over the prior art of record and are in condition for allowance. The Examiner is respectfully requested to pass the above application to issue at the earliest possible time.

Should the Examiner find the application to be other than in condition for allowance, the Examiner is requested to contact the undersigned at the local telephone number listed below to discuss any other changes deemed necessary in a telephonic or personal interview.

The Commissioner is hereby authorized to charge any deficiency in fees or to credit any overpayment in fees to Attorney's Deposit Account No. 50-0481.

Respectfully Submitted,

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